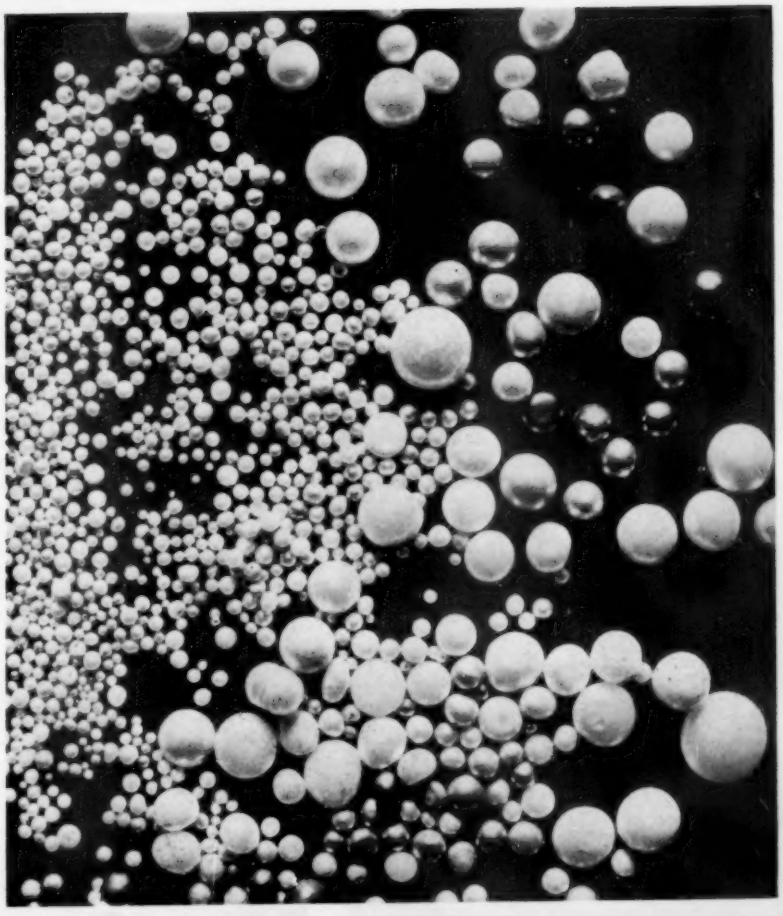
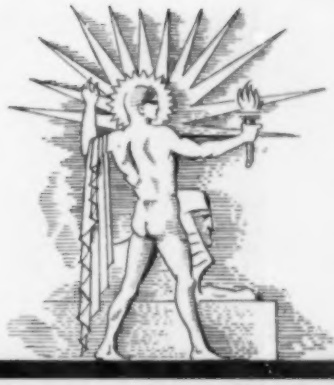
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •





JUNE 18, 1932

"Ol' Man Ribber's" Treasure

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SCIENCE NEWS LETTER

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The Weekly Summary of Current Science

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? DO YOU KNOW THAT ?

Government scientists recently examined some Chinese and Japanese papers said to date from the fourteenth century and still excellently preserved.

Just one hundred and one years ago, Lord Beaconsfield wrote home from Cairo that "the most delicious thing in the world is a banana, which is richer than a pineapple."

The Brazilian city of Rio de Janeiro, which now has a population of more than a million, had only 3,850 residents in 1858.

A South American insect that can make its diet entirely off the prickly pear may help Australia rid itself of this widespread troublesome weed.

Parachute leaps from airplanes at night are being attempted, with the aid of spot and flash lights.

A baby has two or three times as much skin surface in proportion to weight as an adult has; so it heats up and cools off faster than the adult.

The Egyptians were among the world's great archers, using the bow as their main weapon in fighting.

An American consul in Tientsin reports that "athlete's foot" is known in China as "Hong Kong foot" and is apparently a more general ailment than in the United States.

"An observer estimates that 90 per cent. of the forest land of North Florida has been fire swept during the fall and winter," says an editorial in *American Forests*.

Gold and aluminum, both malleable metals, when combined form an alloy that is non-malleable.

WITH THE SCIENCES THIS WEEK

CURIOSITY-AROUSING questions are prepared concerning the most interesting and important news in each issue. These questions should be a mental stimulant for the adult reader and a boon to the teacher who uses the Science News Letter to add zest to her classroom instruction.

Book reference in italic type is not the source of information of the article, but a reference for further reading on the subject of the article. Books cited can be supplied by Librarian, Science Service, at publisher's price, prepaid in U. S.

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ANTHROPOLOGY

Four Neanderthalers Found in Palestine Reveal Ancient Types

THE important discovery of four skeletons of Neanderthal man by archaeologists digging in the Cave of the Kids, near Haifa, Palestine, has been announced by Dr. George Grant MacCurdy of Yale University. One of the Palestine cave men, who lived some 75,000 years ago, was found clasping to his breast the huge jaw of a wild boar.

The skeletons just discovered are relatively complete, Dr. MacCurdy reported. Added to three skeletons found in the same cave a month ago, these four skeletons make a collection showing for the first time how different Neanderthalers of Palestine were from the Neanderthalers of Europe.

The remains of the men of Palestine were found by the Joint Expedition of the American School of Prehistoric Research and the British School of Archaeology. Dr. MacCurdy, director of the American School, was notified of the discovery by Dr. Theodore D. McCown, who is directing field researches of the American School.

"The skeletons were lying near the bed rock and in a stony matrix," said Dr. MacCurdy. "McCown is bending every effort to remove them safely from the deposit and ship them to London in time for exhibition at the International Congress of Prehistoric and Proto-Historic Sciences, August 1 to 6."

A tracing of one of the adult skulls has been received by Dr. MacCurdy, who compares it with Europeans of the same period of prehistory. Like the Europeans, this Palestine man had powerful musculature, massive, overhanging eyebrow ridges, and protruding upper teeth. But the Palestine man did not have a receding chin, and his forehead was higher than that of his contemporaries in Europe.

Dr. MacCurdy stated that the discovery of these skeletons "is destined to throw a flood of light on that particular species of fossil man. The specimens hitherto found in Europe have been so few and fragmentary that there was little evidence to suggest that the race or species might include a number of varieties. First intimation of marked variation came with the discovery of the skull at Broken Hill, Rhodesia, some ten years ago. In 1925, Turville-Petre found a portion of the cranial cap of a Neanderthal skull in the Cave of the Robbers near the Sea of Galilee. But the fragment being small gave no indication of variation from the European type."

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PHYSICS

Experiments Explain Cosmic Ray Effects

MORE knowledge about the cosmic rays that bombard the earth from outer space was obtained through experiments conducted by Prof. Arthur H. Compton, University of Chicago Nobel prize physicist, when he and associates last summer climbed Mt. Evans in Colorado and made measurements of the effect of these rays on chambers full of air, nitrogen and other gases.

Prof. Compton is now abroad making further experiments and his report has appeared in the *Physical Review*.

Cosmic rays break up a gas, such as air, into atoms that are negatively and positively charged and it is thus made to conduct electricity easier. Such ionization, as it is called, usually increases as the pressure rises, but for cosmic rays the conductivity of the gas does not become greater after the pressure is 140 times that of the atmosphere. Prof. Compton explains this by the hypothesis that the ion gas particles formed by the rays are so close together at high pressures that they reunite readily and thus destroy the enhanced conductivity. In his mountain experiments of last year, conducted jointly with Dr. R. D. Bennett of the Massachusetts Institute of Technology and Dr. J. C. Stearns of the University of Denver, Prof. Compton predicted and found a variation in ionization with temperature. He suggests that this temperature variation may be the explanation of what has been thought to be a real daily variation in the intensity of the cosmic rays.

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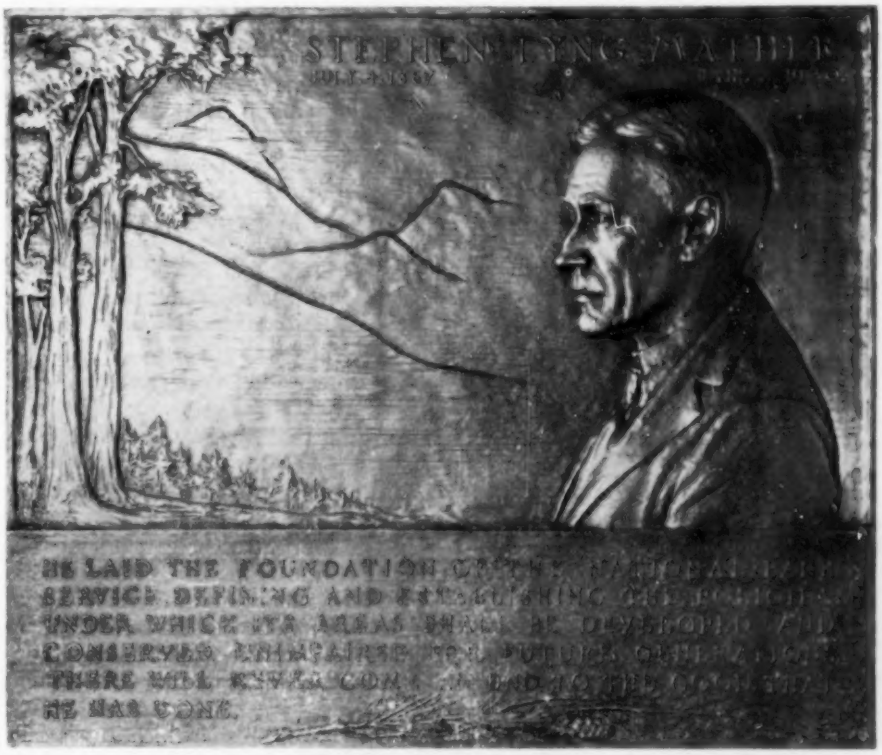

HONORING A FOUNDER

Visitors to the National Parks this summer will find in many of them placques commemorating the work of the late Stephen Tyng Mather, who organized them as a single unified system and laid down the foundations of the policy that now guides their administration. These memorials have been made for the following parks: Yellowstone, Yosemite, Grand Canyon, Ranier and Zion; it is expected that all will be in place by July 4, Mr. Mather's birthday.

ECONOMIC GEOGRAPHY

Farms, Forests, Mines, Ports, Are Prizes in Eastern Strife

Three-Cornered Tug of War Between China, Japan and Russia Ruled by Economics Rather Than Politics

Following is the first of a series of four articles on the tangled and vexed situation in Manchuria and Mongolia, as seen by leading geographers.

CHINESE and Japanese soldiers skirmishing in Manchuria are shadows. The realities of the Far Eastern situation are the soy bean farms, the forests of valuable timber, the railways, warm-water ports, and mines within the coveted territories.

This is the way the contest between China, Japan, and Russia looks to a geographer, Dr. Isaiah Bowman, director of the American Geographical Society.

"Standing beside the open pits of the iron mines at Mukden, (Manchuria), and observing those efficiently run enterprises, it takes no imagination to see what Japan is driving at and struggling to get," said Dr. Bowman to a representative of Science Service. "The iron from Manchuria, and the coal, reflect the two great industrial deficiencies of Japan, two elements of power that come to high development in Manchuria.

"It is more dramatic to read about people than coal. But barons and generals come and go. Coal and farms and seaports remain. They are the significant and the more or less permanent features of any great territorial problem."

A Geographer's War Map

If a geographer were to make a war map of the Far East, he would have it dotted over with red and yellow and blue pins, like any strategic map. The pins would mark, not soldiers and guns, but the rich mines, farms, pastures, and other "realities" of the contest, and the war map would show which contestant had gained control over the geographic prizes.

The geographer's war map, as the Far Eastern situation is developing, would not be limited to Manchuria where Japan and China clash. The area involved would take in Mongolia to the west of Manchuria and the Far Eastern area of Russia which spreads to the north of Manchuria.

Mongolia, with its enormous desert, might not be taken for an international prize package, at first glance. But as the geographer points out, far-inland Mongolia has patches of good farm land, and more can be made by irrigation. More valuable, perhaps, are the pasture lands, forests, mines, and fisheries of the region. Moreover, Mongolia is important as a thoroughfare traversed by the caravans that ply between Russia to the north and China to the south.

Russia has long kept an interested eye on the possibilities in her nextdoor neighbor Mongolia. In 1915, Russia gained a privileged position in Outer, northern, Mongolia. The negotiations gave Russians special rights of pasturage, and allowed Russians to work the mines and timber lands.

The Uncontrollable Frontier

This arrangement lasted only four years. Then Outer Mongolia met with a government upheaval.

In Dr. Bowman newest book, "The Pioneer Fringe," he predicts that new questions respecting Mongolia will arise out of present difficulties between Russia and China. Neither power, he explains, has the strength to control in any stable manner the enormous distances of the common frontier.

Dr. Bowman does not foresee fighting in Mongolia, however.

"The fight," he says, "will take place in, and the settlement be guided by, the Manchurian not the Mongolian realm."

Russia is not the only power to appreciate Mongolia's potential value. Political writers have predicted that Japan's foothold on the Asiatic continent, first gained in Korea, then Manchuria, will next carry Japan on to Mongolia and possibly into the Russian Far East.

The part of Siberia which Russia calls her Far Eastern Area is an irregularly shaped, thick fringe along the Pacific in the northeast corner of Asia. Comparatively little of the land is attractive for farming colonists. The best farm lands are in the southern part, along the Amur River, where wheat and oats are produced. Part of this land lies within the rich black-earth belt which stretches across Russia.

But besides farm lands, the Far Eastern Area has forests of ash, maple, elm, and other valuable trees. Japan buys wood from these Siberian forests. There are also mines, comparatively untapped, containing treasure of gold and silver. Even more alluring to Japanese industry are the mines of coal, iron, lead, tungsten, and feldspar.

Fisheries are another resource of the area. Japanese, by concessions from the Soviet government, are leading figures in the Siberian fisheries industry. Japanese in Kamchatka, for example, supply the world with the bulk of its canned crab meat. The whole fisheries catch of the Far Eastern Area piles up to a weight of 400,000 tons in a year.

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METEOROLOGY

Snow Blanket Keeps Soil From Freezing Deeply

JUST how effective a snow blanket is in keeping the ground warm has been strikingly shown by an investigation of weather conditions on the Michigan peninsula.

Dr. W. J. Humphreys, physicist of the U. S. Weather Bureau, states that when the soil in northern Michigan freezes to a depth of three or four inches, the ground in the southern part of the state freezes to a depth of three or four feet. An earlier and thicker snow blanket is found to explain this difference.

The snowfall on the northern part of the peninsula is much heavier than it is to the south, Dr. Humphreys says. By the time freezing weather sets in, the ground in the north has an insulating cover of snow which retards the escape of soil heat. This cover remains effective until spring, when temperatures are too high for either snowfall or freezing.

Farther south, according to Dr. Humphreys, conditions are different. Snowfall is relatively light, affording the ground little protection against the cold. Sometimes the soil has frozen deeply before the snow appears.

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The U. S. Army Air Corps describes an experimental airaft, provided with paddles which can be used as oars, and capable of floating with six or seven passengers.

MEDICINE

Resistance to Poliomyelitis May Be an Inherited Trait

Hope Expressed That Infantile Paralysis Will be Controlled Through Lessening Susceptibility

ARE RESISTANCE and susceptibility to infantile paralysis inherited?

This question was raised at the meeting of the American Medical Association at New Orleans. The dread scourge of childhood which afflicted some fifteen thousand young persons in last year's epidemic will eventually be controlled by increasing the resistance of the individual child to the disease. This was the hope held out to the general practitioners, the family doctors of the country, by leading investigators of the disease. Efforts to control the disease by preventing the spread of the germ or by fighting the disease itself will be less successful.

Investigating why some children get the disease and others do not, Dr. W. Lloyd Aycock, of Boston, found that it tends to "run in families." He reported a number of families in which the disease occurred more than once, affecting a second child some years after the first one had recovered. He cited particularly the cases of two brothers, orphaned at an early age and reared apart, both of whom developed the disease, indicating a possible hereditary factor.

Nearly nine-tenths of affected muscles in cases of infantile paralysis were restored to normal within two years by proper care and exercise. This was brought out in a discussion of the importance of early careful treatment, to prevent the weakened muscles from stretching. These muscles were in "good" condition at the start of the treatment. About two-thirds of muscles classed as only "fair" were restored to normal, while more than half of those classed as "poor" became normal.

The types of braces and supports used in keeping the paralyzed muscles at rest to prevent their stretching were shown at an exhibit sponsored by the American Medical Association and the U. S. Public Health Service. Taking part were Drs. Aycock, S. D. Kramer, James L. Wilson and Arthur T. Legg, of Boston, Dr. Edward B. Shaw, of San Francisco, Dr. John E. Gordon, of Detroit, and Dr. James P. Leake, of Washington, under the direction of Dr. R. C. Williams, of the U. S. Public Health Service.

Small infantile paralysis patients of New Orleans helped Miss Janet B. Merrill, of Boston, a "poliotherapist," show the physicians how to give just the right amount of exercise to the weakened muscles both in and out of water. Later in the week the disease will be the subject of a special symposium.

Poor posture as a cause of arthritis, or rheumatism, was cited in a discussion of this ancient disease, traces of which have been found in a dinosaur that lived one hundred and fifty million years ago. While there are other causes of the condition, this particular factor affects the function of the organs. Poor function of internal organs may influence the development of arthritis, according to the American Committee for the Control of Rheumatism.

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ASTRONOMY

Einstein Upheld When U. S. Scientist Corrects Germans

EINSTEIN'S prediction of the curvature of light rays near the sun has been upheld by photographs obtained by a German expedition to the May 9, 1929, eclipse, but only after they had been studied and interpreted by an American astronomer.

Ironically, one of the few observational disagreements with the Einstein general theory of relativity was placed in the scientific record by the eclipse expedition of the Einstein Foundation of the Potsdam Observatory, near Berlin, established in honor of the famous scientist. The German astronomers, Freundlich, von Klüber and von Brunn, as the result of their 1929 expedition reported last year after studying their photographs that the deflection of a light ray grazing the sun's edge was 2.24 seconds. The Einstein prediction called for 1.75 seconds.

Dr. Robert J. Trumpler of Lick Observatory, Mt. Hamilton, Calif., has just reported to *Science*, writing from Zürich, Switzerland, that he has found needed scale corrections of the German photographs that cause the value of the observed deflection to be 1.75 seconds with a probable error of plus or minus thirteen hundredths of a second. This is "in precise agreement with the Einstein theory, as well as in good accord with earlier observations."

Dr. Trumpler has studied six other determinations of the way in which star light is bent in the sun's gravitational field as photographed during the total eclipses and the average of all of these also upheld Einstein. These included the results of the British 1919 eclipse expeditions that called attention to the Einstein theory and the 1922 eclipse expedition to Wallal, Australia, of which Dr. Trumpler was a member.

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CHEMISTRY

Minerals in Fruit Juice Determine Jelly "Setting"

PERENNIAL housewifely uncertainty over whether the jelly will "set" has its foundation in a hitherto unsuspected chemical balance of calcium against potassium in the fruit juice. When the jelly-maker adds the juice of a lemon in the hope of helping things along, she is adjusting, in a somewhat hit-or-miss fashion, the hydrogen ion concentration of the complex mixture that boils in the jelly kettle.

This is the domestic significance of recent chemical researches of Dr. S. Glückmann of the Technological Institute, Leningrad. Dr. Glückmann has found that one part of a calcium salt in ten thousand of fruit juice raises its jelly-forming power, while the same proportion of a potassium salt decreases it. Other mineral salts also affect jelly formation, their action depending on their atomic weight and on their ability to form compounds.

These mineral salts, to be effective, must be present in the watery part of the fruit juice, not in the pectin, which is the definitely jelly-forming portion. The role of the natural acids in the fruit juice, or of added lemons, is to break the hold that the mineral elements have on the pectic acid, releasing it for its jelly-forming activity.

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The Jews had no names for the days of the week.

MILITARY SCIENCE

No Flying Devastation For Cities

Visions of Airplane Swarms Dropping Death All Myth, Says Gen. Gilchrist; Closed Windows Good Protection

By FRANK THONE

WAR, the next war, will blot out great cities. So we are told by a whole hierarchy of the prophets of doom. These Jeremiahs stand in the market place (or its modern equivalent, the Sunday newspaper) and foresee death riding on the wings of swarming airplanes that darken the sky, and raining down dreadful poison gases that will kill off the civil population, down to the last infant in the cradle. When the soldiers return from the front, they say, there will be no one to welcome them home. There may not even be any homes, these apocalyptic scribes predict; for their imaginations picture gases that will rot wood and fabric, that will rust and crumble steel.

All this is very fine for providing a shuddery thrill, and to give you a big nickel's worth of Sunday morning reading. But are these direful things really going to happen if another great war breaks out?

Exorcising a Bogy

No! declare soldiers and chemists, emphatically and indignantly. No enemy is going to depopulate New York or San Francisco, no matter how great his malice. Nor could we inflict such woe on any foreign metropolis, even if we should be so filled with the anger of battle that we should desire to do so. Gen. H. L. Gilchrist, Chief of the Chemical Warfare Service, and Dr. H. E. Howe, editor of *Industrial and Engineering Chemistry*, a leading professional journal, have turned a little cold, scientific attention on the great gas bogy that hangs over our cities—and he has vanished!

In the first place, it is pointed out, there is no war gas so deadly that the least whiff of it will kill you. There is no gas suitable for military use that will penetrate any gas mask or find its way into any gas-tight room or dugout. There is no gas cheap enough to be used for wiping out whole cities without first wiping out the whole treasury of the warring nation that might resort to such strategy.

All this talk about new and "secret" gases is just a lot o' bunk, Gen. Gilchrist will tell you bluntly. The gases that figure in all chemical combat plans of the present day are the same gases that were in the hands of the combatants at the close of the World War: phosgene, mustard gas and lewisite. And while they are all of high military effectiveness in their several ways, none of them will pass through the soda-lime and charcoal of a gas mask; indeed, none of them will come in through the cracks around a reasonably tight window. The well-fitted windows of an ordinary house or office building offer considerable protection against them.

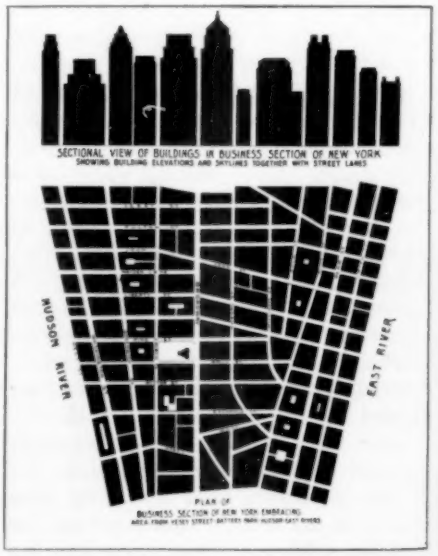
In the city that is surely coming in the immediate future, a cloud of any of the known war gases would have even less chance to penetrate into the buildings and reach the inhabitants. For with the coming into general use of air-conditioning plants for apartments, business blocks and even small homes, as they are now used in movie palaces, de luxe passenger trains and the Houses of Congress, we shall unquestionably see an entirely new style in architecture: buildings with windows not built to open at all; or perhaps even with no windows whatever, for we may come to prefer the even illumination of electric lights to the uncontrolled and fickle light of the sun. And it will be a relatively simple matter to add a "detoxicator" to the air-conditioning apparatus.

That Slaughter of Civilians

But suppose a large part of the population should be caught in the open, unprovided with the civilian gas masks with which Soviet citizens are now being equipped, and which are said to be contemplated for Frenchmen as well. Suppose an air fleet should put down a blanket of phosgene or mustard gas and lay them out in windrows. Would the rescue parties find them all corpses, with the life gone out of them beyond retrieving?

For answer, Gen. Gilchrist points to the casualty record of the A. E. F. in the World War. Of the 258,338 wounded in battle, 34,249 died on the battlefield. Of this number, only 200 deaths were due to gas; the rest suffered from gunshot, shellfire and other causes. Of the remainder, the 224,089 who were removed to the hospital, 70,552 were suffering from gas, 153,537 from weapons other than gas. Of the gas sufferers, 1,221 died; of the other casualties, 12,470 died. The percentage of deaths among the hospitalized gas casualties was 1.73; among the wounded from other causes the death rate was slightly over eight per cent. There is no reason to suppose that the percentage would be materially different if a civilian population were gassed. So it would take a simply impossible number of gas-bombing raids over any large city to kill off its whole population, even assuming you laid everybody out at every visit, and that each time 1.73 per cent. of the population died.

It will seem paradoxical, but the fact is that a modern American city is a far better place in which to face a gas raid from the air than a comparable area at the front would be. To be effective, a military gas must be fairly heavy, and hug the ground. If it forms a layer more than twenty feet thick, the gas from a practicable quantity of shells or bombs is too diffuse to have any effect. But twenty feet is an inconsiderable height in a modern city. If a plane raid



PROTECTED BY ITS TOWERS

Gen. Gilchrist's chart of lower Manhattan, showing relative areas of streets and buildings. Hits in streets might be effective at lower levels, unless windows are kept shut. Hits on roofs or walls are ineffective.

should begin showering a city with gas, the alarm cry might well be, "To the skyscrapers!" Get a few stories above the ground, and you're safe, even with the windows open.

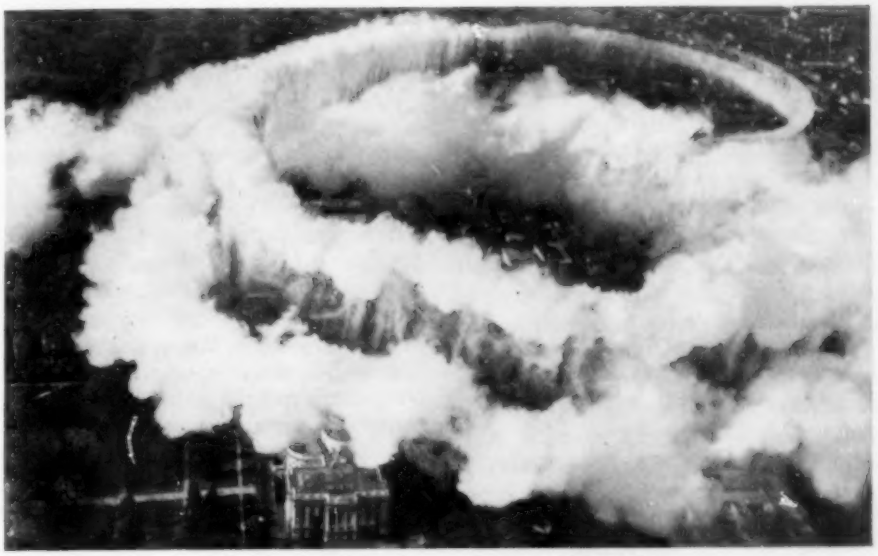
Again, those same tall buildings greatly reduce the chances of gas bombs falling in the streets, where they must fall to have any appreciable effect. At a liberal estimate, only one-fourth of a downtown business district is used for streets and alleys; the rest is under roofs. Bombs scattering their contents on roofs would of course be largely wasted. The heavy gas would flow down the eavespouts or over the edges like water; or would simply be caught behind the breast-walls until the wind blew it away. Moreover, bombs dropped from planes do not plunge straight downward; they follow on oblique course, influenced by the forward speed of the plane at the moment of launching. Therefore many of them would dash themselves against the sides of the buildings, here again they would have much diminished effect. The bricks would soak up much of the contents, Gen. Gilchrist says.

The City's Inherent Defenses

To be sure, if a bomb thus driving down aslant should chance to hit a window, it would be just too bad for the people in that particular room, but by the same token the effects would be prevented from reaching anybody else.

The explosive force of the bombs themselves must be discounted. The purpose of a gas projectile is to deliver the gas; so as a rule only enough explosive is included to break the casing and scatter the contents. If you want to put in enough TNT to blow down the neighboring walls, or even to shatter the windows, you have that much less room for gas. And your prospective victims can strengthen their lower-story windows against you in various ways—for one, by installing shatter-proof glass like that used in windshields.

But most effective of all the city's inherent gas defenses is its irregular skyline. A tall town like Manhattan is an artificial mountain range—a range with some right respectable peaks in it, too, when you come to think of it. And like every mountain range intersected with a maze of narrow canyons, it is the scene of constantly swirling air currents. You have only to remember what the news pictures of confetti and ticker-tape showered on a visiting celebrity look like, to know what would happen to a cloud of gas released into those same canyons. In normal weather the wind would sweep it out in very short order.



NOT PRACTICABLE WITH POISON GAS

Because an airplane can protect the capitol of California, in Sacramento, by laying a smoke screen over it, like this, some believe that an airplane could kill off all its people by letting loose a cloud of poison gas. General Gilchrist dissents.

But what of gases that might settle to the bottoms of these canyons, and lurk at street level waiting for the people to come out? The vesicants, or blistering chemicals, like mustard gas and lewisite, are just such ground-huggers. Well, here again the city has an advantage. Its hard, even, glazed paved streets would not offer these gases the same hospitality that they find on the uneven, vegetation-covered, porous soil of the battle front. And the street-flushing machines and fire-hoses with which even small cities are equipped are gas-ridders such as line officers dream of and long for, but cannot have.

Another service is rendered to the people of a possibly threatened city by its mountainous skyline. To plant a row of gas bombs accurately along a street, a plane must fly very low. It is a poor metropolis that does not provide many high buildings, making low flight dangerous or impossible, and furthermore providing beautiful vantage-points for the planting of machine guns and pom-pom cannon for the livelier reception of raiding planes that might penetrate the ring of heavier anti-aircraft guns that will be located farther out.

Anyway, why waste time and ammunition on civil populations? Killing civilians is dreadfully expensive business. Gen. Gilchrist has made a study of the bombings of London and Paris that took place during the World War. In London there were 1,413 civilians killed and 3,408 wounded, and the industrial morale possibly damaged somewhat. But it cost the wrecking of 29 Zeppelins and 41 big bombing planes, the detonation of 280 tons of bombs and the time of a lot of highly trained fighting men—not to mention the investment in the lives of those shot down. Casting up a total of the tangible expenditures only, Gen. Gilchrist has calculated that each London civilian killed by the German air raids cost the German government $27,000. It would have been much cheaper and would have done their side more good if they had stuck to business on the West Front and dropped their bombs on soldiers and batteries and ammunition dumps.

Furthermore, the psychological effect was a boomerang. Instead of being thrown into a panic by the raids, the English were made fighting mad. Many a Briton who might have stayed home and escaped his military liabilities a while longer found his way to the trenches just for a chance to get a whack at the fellow who had been taking a whack at him.

So it is highly likely that unless somebody does really discover one of those highly improbable "secret gases," chemical warfare is likely to stay at the front, to be used for strictly military objectives when conditions are favorable.

This article was edited from manuscript prepared by Science Service for use in illustrated newspaper magazines.

PHYSICS

French Make New Storage Battery Using Iodine

IODINE, the same chemical element that is used as an antiseptic for cuts, is the active material in a storage battery of new type invented by Francois Boissier and announced to the French Academy of Sciences.

The storage battery looks like an ordinary dry cell, with a rod electrode of carbon in the center surrounded by an absorbent material saturated with zinc iodine, contained in an electrode shell of metallic zinc. When the battery is charged the zinc iodine breaks down into metallic zinc, which is deposited on the zinc sheeting, and iodine, which accumulates on the carbon electrode and in the absorbing material which may be an absorbent carbon powder. The zinc iodine is re-formed during the discharge of electricity.

M. Boissier claims that the iodine storage battery is superior to the conventional storage batteries of the lead or nickel-iron varieties. The plates do not disintegrate, there is no acid or caustic liquid to spill, no dangerous gases or vapors are given off, and continual maintenance is not necessary. The iodine battery is very rugged and easily transported. A disadvantage is high internal resistance, but high output is obtained by making the batteries long and of small diameter and placing them in parallel.

Science News Letter, June 18, 1932

ANTHROPOLOGY

Fingerprints May Protect In Kidnapings

BECAUSE of their usefulness in identifying criminals, fingerprints are not considered exactly respectable. Nevertheless fingerprints are being used more frequently as a sort of personal seal, more individual than the signet rings that kings used in ancient times. Clever penmen can forge signatures but skin patterns are peculiarly one's own.

In these days when kidnapings are frequent and accidents happen, a fingerprint record stored away in a safe deposit box or given to a friend may prove its usefulness. Such a record is good insurance. Many hospitals take the footprints of new-born babies to guard against baby mix-ups. All new U. S. civil service employees have their fingerprints recorded as a matter of routine.

In the great collection of fingerprints in the federal Department of Justice's division of identification, now numbering nearly three million and increasing at the rate of 1,200 daily, any print having a mate on file can be matched in a few hours. The efficient working of this national bureau would amaze even Sir Francis Galton who forty years ago classified and proved the usefulness of fingerprints.

If you wish to fingerprint yourself, just hold the finger to be printed in your other hand and roll it firmly once from side to side on a clean rubber stamp ink pad and again on a sheet of clean white paper on which you wish the print recorded.

A single clear print made in this way will enable any expert to identify you, though of course it is preferable to make, label and sign prints of all fingers. A date is unnecessary, for your fingerprints remain the same from your birth until even after your death.

Science News Letter, June 18, 1932

CONSERVATION

Tax For Game Refuges Unlikely This Session

A FEDERAL tax of one dollar to be paid by all hunters of migratory birds will not become an actuality this year, and will be bitterly fought in the next congressional session.

This became apparent today when the bill providing for such a tax, reported out favorably by the Senate Committee on Conservation of Wild Life Resources, was attacked in the Senate by Senator C. C. Dill of Washington, when it came up on the calendar.

The Senate Committee on the Conservation of Wild Life Resources, in reporting the bill favorably, stated that hearings had shown that there is a shortage of wild fowl in certain but not all sections of the country. Purchase of sanctuaries was seen as the only method by which the choicest of birds could be kept in existence. In order to raise money for purchasing sanctuaries and extending Federal enforcement over the hunting of migratory birds, the committee said, the only practical method was to tax the persons who did the shooting.

The penny-a-shell tax met too many objections to be reported favorably by the committee, it was asserted.

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IN SCIENCE

PUBLIC HEALTH

States Reach Standards In Health Reporting Service

MAINE and Montana have been added to the list of states which have attained the standards for accurate reporting of communicable diseases set by the U. S. Public Health Service. The states reaching this standard now number twenty-six.

The U. S. Public Health Service has computed the number of cases of a disease which occur, on the average, for every death from that disease. States which report this average number or more, for every death from the disease in the state, are considered as having reached the standard in reporting.

Eleven cases of diphtheria, for example, occur for every diphtheria death, on the average. If there are five deaths from diphtheria reported in Maine for one month there should be 55 cases reported, the public health officials have figured. They have computed ratios also for measles, scarlet fever, typhoid fever and whooping cough.

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ZOOLOGY

Muddy Mississippi Yields Pearls That Rival Orient's

See Front Cover

PEARLS we usually picture as coming up from limpid greenish tropical sea depths, in the fingers (or perhaps the mouth) of a swimming brown-skinned native. It seems a bit of a comedown to think of pearls coming out of the prosaic waters of the muddy Mississippi—and as a mere adjunct of the button industry, at that.

Yet so it is. The $3,000 handful of pearls photographed for the cover of this issue of the SCIENCE NEWS LETTER by Cornelia Clarke were taken out of river mussel shells somewhere near Muscatine, Iowa. Every mussel fisherman spends his time hoping that the next pair of shells he pries apart will yield not only their quota of button blanks, but a pearl that will drop a month's pay in his lap in a minute.

Science News Letter, June 18, 1932

NCE FIELDS

ENGINEERING

Oil Yields Predicted From Pressures at Well Bottoms

OIL men are dropping gages down their wells to measure accurately pressure several thousand feet below the surface of the earth. This rapidly spreading practice, described before the American Petroleum Institute by H. D. Wilde, Jr., of Houston, Texas, enables them more economically to get oil from the well and to conserve it better.

Pressure at the top of a well cannot be taken as an accurate indication of pressure at the bottom, Mr. Wilde said. So the deep measurements are made. From a record of the decline of these pressures an engineer can predict when the field will change from flowing to pumping and how much oil it will ultimately produce, he declared.

Science News Letter, June 18, 1932

SEISMOLOGY

California Earthquake Center Located off Coast

THE EARTHQUAKE that destroyed part of the city of Eureka, Calif., on Monday, June 6, was the most severe felt on the Pacific Coast since the Santa Barbara quake of 1925, U. S. Coast and Geodetic Survey scientists stated after examination of data from eleven seismological observatories in the United States and Canada. However, neither Eureka nor any of the other towns that were shaken stood directly over the point of greatest earth movement, for the quake's epicenter was located at sea, a short distance off the mouth of the Klamath river. It was in latitude 42 degrees north, longitude 124 degrees west.

In the excitement over the California earthquake, a second shake, which also occurred at sea, off Santiago de Cuba, was overlooked by everyone but the scientists. They traced the epicenter of this second earthquake to latitude 18.5 degrees north, longitude 76 degrees west. Its time of origin was 6:50 a. m., eastern standard time.

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ARCHAEOLOGY

To Explore Ruins of One of Oldest Pueblos

RUINS of a very ancient Indian settlement near Allentown, Ariz., called one of the most remarkable archaeological sites in America, are to be excavated this summer by an expedition from the Bureau of American Ethnology. Dr. Frank H. H. Roberts, of the Bureau, is in charge of the work.

Dr. Roberts, who explored the site last season, declared that from three to five seasons of work would be necessary to restore the ancient site to something like its original condition. The settlement is of special importance scientifically because it was inhabited not only by Pueblos of the Southwest, but also by some of the Basket Makers, who preceded the Pueblos. This gives the village a history which began in a very early century of the Christian era and continued into the Golden Age of the Pueblos, which occurred about 900 to 1200 A. D.

"Complete excavation of the site," Dr. Roberts explained, "will throw light on the closing days of the Basket Makers, show the beginnings of Pueblo culture, and trace its growth through two subsequent periods. For some reason, as yet unrevealed, the place was abandoned during the third Pueblo period and never reoccupied."

Dr. Roberts has already found the pit houses, set mostly underground, built by the early inhabitants. This summer he plans to make progress in excavating the larger buildings which were constructed by the later Pueblo inhabitants.

Science News Letter, June 18, 1932

PUBLIC HEALTH

Washington's Bonus "Army" Called Epidemic Menace

DANGER of epidemics breaking out in the camp of the "bonus army" in Washington, D. C., and spreading across the country in the wake of the men when they return to their homes was pointed out to state health officers throughout the nation in a special message from Surgeon-General Hugh S. Cumming of the U. S. Public Health Service.

After a personal visit to the camp, Surgeon-General Cumming declared that the camp facilities are "entirely inadequate and dangerous." He urged the state health officers as a public health protective measure to use their utmost influence and power to prevent any more men from marching to Washington to join those already camped on the outskirts of the city.

"The assembling of the so-called bonus army in Washington presents a serious problem in the interstate spread of disease," his message read.

The gathering of these men here represents a menace to the public health and a consequent danger to the people of the states when they return.

"For the protection of the public health everything should be done to discourage the departure from your state of groups of marchers for Washington," he concluded.

When such large groups of men are assembled without adequate sanitary facilities and health inspection or medical care the appearance of one or two cases of a contagious disease, whether it be a cold or smallpox or typhoid fever, is most apt to result in a wide and rapid spread until epidemic proportions are reached. The public health officials are now concerned with guarding against such an occurrence and with protecting the rest of the population if epidemics do arise in this camp.

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ENTOMOLOGY

Longer Lives Sought For Mexican Jumping Beans

THE MEXICAN Ministry of Agriculture is trying to make the national jumping bean jump longer. The demand for jumping beans has grown in leaps and bounds since the world depression, the greatest market being Europe.

But the merchants of this product say that when their beans arrive in Europe, they have almost finished jumping. So they have asked their government to help, and make the beans last longer. Dr. Alfons Dampf, director of scientific research of the Mexican Ministry of Agriculture, thinks this can be done by selection and propagation of longer-jumping varieties.

The jumping bean is not a bean, but the fruit of a euphorbia native both in southern desert United States and Mexico. The larva of a tiny moth enters the seed and makes it jump. It eats the contents, and the contortions of the fattened larva cause the movements of the hollow shell. The moths come out in spring and fall, and then the "bean" is dead.

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ASTRONOMY

Distance of the Stars

"A Classic of Science"

While the Orbits of the Planets Fell Into Line When Newton Applied His Theory, the Stars Remained Remote

THE MATHEMATICAL PRINCIPLES OF NATURAL PHILOSOPHY, by Sir Isaac Newton; translated into English by Andrew Motte: to which are added NEWTON'S SYSTEM OF THE WORLD . . . London: 1819. (*Philosophiae Naturalis Principia Mathematica*, 1687).

IF THE earth is supposed to stand still, and the fixed stars to be revolved in free spaces in the time of 24 hours, it is certain the forces by which the fixed stars are retained in their orbs are not directed to the earth, but to the centres of the several orbs, that is, of the several parallel circles, which the fixed stars, declining to one side and the other from the equator, describe daily; also that by radii drawn to the centres of those orbs the fixed stars describe areas exactly proportional to the time of description. Then, because the periodic times are equal (by cor. 3, prop. 4, book I), it follows that the centripetal forces are as the radii of the several orbs, and that they will perpetually revolve in the same orbs. And the like consequences may be drawn from the supposed diurnal motion of the planets.

That forces should be directed to no body on which they physically depend, but to innumerable imaginary points in the axis of the earth, is an hypothesis too incongruous. It is more incongruous still that those forces should increase exactly in proportion of the distances from this axis; for this is an indication of an increase to immensity, or rather to infinity; whereas the forces of natural things commonly decrease in receding from the fountain from which they flow. But, what is yet more absurd, neither are the areas described by the same star proportional to the times, nor are its revolutions performed in the same orb; for as the star recedes from the neighboring pole, both areas and orb increase; and from the increase of the area it is demonstrated that the forces are not directed to the axis of the earth. And this difficulty (cor. 1, prop. 2) arises from the twofold motion that is observed in the fixed stars, one diurnal round the axis of the earth, the other exceedingly slow round the axis of the ecliptic. And the explication thereof requires a composition of forces so perplexed and so variable, that it is hardly to be reconciled with any physical theory.

That there are centripetal forces actually directed to the bodies of the sun, of the earth, and other planets, I thus infer:

The moon revolves about our earth, and by radii drawn to its centre describes areas nearly proportional to the times in which they are described, as is evident from its velocity compared with its apparent diameter; for its motion is slower when its diameter is less (and therefore its distance greater), and its motion is swifter when its diameter is greater.

The revolutions of the satellites of Jupiter about that planet are more regular; for they describe circles concentric with Jupiter by equable motions, as exactly as our senses can distinguish.

And so the satellites of Saturn are revolved about this planet with motions nearly circular and equable, scarcely disturbed by any eccentricity hitherto observed.

That Venus and Mercury are revolved about the sun, is demonstrable from their moon-like appearances: when they shine with a full face, they are in those parts of their orbs which in respect of the earth lie beyond the sun; when they appear half full, they are in those parts which lie over against the sun; when horned, in those parts which lie between the earth and the sun; and sometimes they pass over the sun's disk, when directly interposed between the earth and the sun.

And Venus, with a motion almost uniform, describes an orb nearly circular and concentric with the sun.

But Mercury, with a more eccentric motion, makes remarkable approaches to the sun, and goes off again by turns; but it is always swifter as it is near to the sun, and therefore, by a radius drawn to the sun, still describes areas proportional to the times.

Lastly, that the earth describes about the sun, or the sun about the earth, by a radius from the one to the other, areas exactly proportional to the times, is demonstrable from the apparent diameter of the sun compared with its apparent motion.

These are astronomical experiments; from which it follows, by prop. 1, 2, 3, in the first book of our *Principles*, and their corollaries, that there are centripetal forces actually directed (either accurately or without considerable error) to the centres of the earth, of Jupiter, of Saturn, and of the sun. In Mercury, Venus, Mars, and the lesser planets, where experiments are wanting, the arguments from analogy must be allowed in their place. . . .

One System of Bodies

Because the fixed stars are quiescent one in respect of another, we may consider the sun, earth, and planets, as one system of bodies carried hither and thither by various motions among themselves; and the common centre of gravity of all (by cor. 4 of the laws of motion) will either be quiescent, or move uniformly forward in a right line: in which case the whole system will likewise move uniformly forward in right lines. But this is an hypothesis hardly to be admitted; and, therefore, setting it aside, that common centre will be quiescent: and from it the sun is never far removed. The common centre of gravity of the sun and Jupiter falls on the surface of the sun; and though all the planets were placed towards the same parts from the sun with Jupiter, the common centre of the sun and all of them would scarcely recede

twice as far from the sun's centre; and, therefore, though the sun, according to the various situation of the planets, is variously agitated, and always wandering to and fro with a slow motion of libration, yet it never recedes one entire diameter of its own body from the quiescent centre of the whole system. But from the weights of the sun and planets above determined, and the situation of all among themselves, their common centre of gravity may be found; and, this being given, the sun's place to any supposed time may be obtained.

About the sun thus librated the other planets are revolved in elliptic orbits, and, by radii drawn to the sun, describe areas nearly proportional to the times, as is explained in prop. 65. If the sun was quiescent, and the other planets did not act mutually one upon another, their orbits would be elliptic, and the areas exactly proportional to the times. (by prop. 11, and cor. 1, prop. 13). But the actions of the planets among themselves, compared with the actions of the sun on the planets, are of no moment, and produce no sensible errors. And those errors are less in revolutions about the sun agitated in the manner but now described (by prop. 66, and cor. prop. 68), especially if the focus of every orbit is placed in the common centre of gravity of all the lower included planets; viz. the focus of the orbit of Mercury in the centre of the sun; the focus of the orbit of Venus in the common centre of gravity of Mercury and the sun; the focus of the orbit of the earth in the common centre of gravity of Venus, Mercury, and the sun; and so of the rest. And by this means the foci of the orbits of all the planets, except Saturn, will not be sensibly removed from the centre of the sun, nor will the focus of the orbit of Saturn recede sensibly from the common centre of gravity of Jupiter and the sun. And therefore astronomers are not far from the truth, when they reckon the sun's centre the common focus of all the planetary orbits. In Saturn itself the error thence arising does not exceed 1′ 45″. And if its orbit, by placing the focus thereof in the common centre of gravity of Jupiter and the sun, shall happen to agree better with the phaenomena, from thence all that we have said will be farther confirmed. . . .

To Immense Distances

Thus I have given an account of the system of the planets. As to the fixed stars, the smallness of their annual parallax proves them to be removed to immense distances from the system of

ISAAC NEWTON
As he appeared at the time the "Principia" was published.

the planets: that this parallax is less than one minute is most certain; and from thence it follows that the distance of the fixed stars is above 360 times greater than the distance of Saturn from the sun. Such as reckon the earth one of the planets, and the sun one of the fixed stars, may remove the fixed stars to yet greater distances by the following arguments: from the annual motion of the earth there would happen an apparent transposition of the fixed stars, one in respect of another, almost equal to their double parallax; but the greater and nearer stars, in respect of the more remote, which are only seen by the telescope, have not hitherto been observed to have the least motion. If we should suppose that motion to be but less than 20″, the distance of the nearer fixed stars would exceed the mean distance of Saturn by above 2000 times. Again; the disk of Saturn, which is only 17″ or 18″ in diameter, receives but about 1/2,100,000,000 of the sun's light; for so much less is that disk than the whole spherical surface of the orb of Saturn. Now if we suppose Saturn to reflect about ¼ of this light, the whole light reflected from its illuminated hemisphere will be about 1/4,200,000,000 of the whole light emitted from the sun's hemisphere; and, therefore, since light is rarefied in the duplicate ratio of the distance from the luminous body, if the sun was $10{,}000\sqrt{42}$ times more distant than Saturn, it would yet appear as lucid as Saturn now does without its ring, that is, something more lucid than a fixed star of the first magnitude. Let us, therefore, suppose that the distance from which the sun would shine as a fixed star exceeds that of Saturn by about 100,000 times, and its apparent diameter will be $7^{v}.\ 16^{vi}.$ and its parallax arising from the annual motion of the earth 13″″: and so great will be the distance, the apparent diameter, and the parallax of the fixed stars of the first magnitude, in bulk and light equal to our sun. Some may, perhaps, imagine that a great part of the light of the fixed stars is intercepted and lost in its passage through such vast spaces, and upon that account pretend to place the fixed stars at nearer distances; but at this rate the remoter stars could be scarcely seen. Suppose, for example, that ¾ of the light perish in its passage from the nearest fixed stars to us; then ¾ will twice perish in its passage through a double space, thrice through a triple, and so forth. And, therefore, the fixed stars that are at a double distance will be 16 times more obscure, viz. 4 times more obscure on account of the diminished apparent diameter; and, again, 4 times more on acocunt of the lost light. And, by the same argument, the fixed stars at a triple distance will be 9 x 4 x 4, or 144 times more obscure; and those at a quadruple distance will be 16 x 4 x 4 x 4, or 1024 times more obscure; but so great a diminution of light is no ways consistent with the phenomena and with that hypothesis which places the fixed stars at different distances.

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ECOLOGY

One Acre of Forest Yields Browse For One Deer

HOW much ranging land does a deer need if it is to find sufficient food? This question, perplexing to foresters and others associated with game reserves, has been answered for the Pennsylvania woodlands by Drs. E. B. Forbes and L. O. Overholts of Pennsylvania State College.

Their observations indicate that at least one acre of the best forest browse, or greenery, is needed during the growing season to support a single deer, while during the winter a much larger area of sparser browse is required.

The investigators obtained their data from the study of four deer who were confined in a woodland inclosure of 4.87 acres from one spring through the following autumn. The results, they state, represent the upper limit of the very wide range of variation in the capacity of forests to support deer.

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ASTRONOMY

Carbon Dioxide Discovered In Atmosphere of Venus

DISCOVERY that carbon dioxide is probably present in the atmosphere of the planet Venus, next-door neighbor of the earth toward the sun, has been announced by the Carnegie Institution of Washington.

Speculation as to the existence of life on the earth's twin sister planet will be revived by the studies of the infra-red or heat spectrum of Venus made with the world's largest telescope, the 100-inch reflector, at Mt. Wilson, Calif., Observatory by Dr. Walter S. Adams, director, and Dr. Theodore Dunham.

The reported discovery is also notable because it is the first time that a gas of any kind has been detected upon any planet except the earth.

For years it has been known that Venus is covered with an atmosphere of considerable extent. Upon the rare occasions of the transit of Venus, when it passes in front of the sun, the planet is surrounded by a ring of light when it is in line with the edge of the sun. This light aura is due to refraction of the sun's rays by the atmosphere of Venus. Clouds cover the surface of Venus so completely that it is believed that astronomers seldom if ever see its real surface. The thickness of the atmosphere below the clouds is estimated to be about 4,000 feet.

Drs. Adams and Dunham used a powerful telescope and spectroscope on the infra-red sunlight reflected from Venus and discovered that three bands of invisible heat-light were missing. These were absorption bands that they concluded were due to carbon dioxide in the Venus atmosphere cutting off these particular wavelengths as the light passed through the planet's atmosphere.

Previous searches for Venus gases, such as oxygen, water vapor and carbon dioxide, all essential to life as we know it on earth, were fruitless.

Carbon dioxide is the gas given off by animal and plant breathing and used by plants in the making of starches and sugars. Its discovery on Venus will justify renewed discussion of the possibility of life of some sort on that planet. Research has shown that the surface temperatures of Venus are somewhat like those of the earth although probably warmer. If future researches should show oxygen and water present, life on Venus might be considered more probable.

The Mt. Wilson discovery of carbon dioxide on Venus will undoubtedly encourage those who like to believe that the earth is not the only life-bearing speck of dust in the universe.

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PUBLIC HEALTH

Depression Blamed For Increase in Trench Mouth

DEPRESSION is blamed for an increase in trench mouth, scientifically known as Vincent's infection, Dr. Alfred Walker of the American Dental Association has announced after studying data secured in a survey by the association. The disease has increased 100 per cent. in New York State in the last nine years, the survey showed. Similar alarming increases have been reported elsewhere.

While kissing was formerly blamed for the spread of this gum and mouth infection, lowered resistance due to worry over the depression is now sharing the blame in the opinion of dentists. Use of glasses instead of paper drinking cups in public places, and of unclean tableware is also blamed for the spread of the disease. The disease is extremely contagious. In the mild form it attacks the gums, resulting in a tender mouth. In the extreme cases it is characterized by high temperature, headaches, nausea, loss of appetite, bleeding and glandular enlargement. Death may follow an acute attack. The chronic form is more prevalent now, the survey showed.

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PSYCHIATRY

Mental Disease In Identical Twins Affects Both

NEW LIGHT on the relative importance of heredity and environment as factors causing certain types of mental disease, and also juvenile delinquency and criminal tendencies, is gained as a result of a study of identical and non-identical twins being conducted at the University of Southern California by Dr. Aaron J. Rosanoff.

A total of one thousand pairs of twins with mental diseases is being sought by the scientist, and already records of 404 have been obtained. This is believed to be the largest collection of such records ever gathered. A preliminary report of the data now available will be published in *Eugenical News*.

Of those twins that were of the same sex and probably with origin in a single ovum, or egg cell, and therefore with the same hereditary equipment, 116 pairs had both twins affected and only fifteen pairs with but one individual affected, it was found by Dr. Rosanoff.

An entirely different picture is presented by the group containing twins of opposite sex and therefore origin in separate egg cells with different heredity. Of these 26 pairs had both twins affected and 75 pairs where only one member was involved.

Of the twins of the same sex, but probably non-identical, 53 pairs had both members affected and 67 had only one with the trouble.

The "disorders" considered included mental deficiency, epilepsy, dementia praecox, manic-depressive psychoses, and also behavior problems in children, adult crime, and juvenile delinquency.

As a check on these results, an associate of Dr. Rosanoff, Doncaster G. Humm, has undertaken a parallel study of brothers and sisters who are not twins.

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GENETICS

Flower Surgery Makes Heredity Control Possible

DELICATE surgical operations on parts of flowers are used by three research scientists at the Station for Experimental Evolution at Cold Spring Harbor, N. Y., to control the heredity of the plants in their breeding experiments. The experimenters are Dr. J. T. Buchholz and C. C. Doak of the University of Illinois, and Dr. A. F. Blakeslee of the Carnegie Institution of Washington.

When pollen grains are deposited in a flower, they adhere to the sticky end of a long, slender projection called the "style," which rises from the seed-bearing part or ovary. Each grain then sprouts a slender tube, that grows downward through the style until it reaches the ovary. This is a real race of males,

and speed of growth determines which shall possess the limited number of females, the egg cells, waiting below and thus become parents to new plants.

Prof. Buchholz and his associates found that some of the pollen-tubes, the hereditary effects of which they especially wished to study, were sluggards in the race and arriving late found no unfertilized females and therefore had no opportunity to leave offspring to bear the particular hereditary qualities which they carried. The differences in growth rate of pollen-tubes defeated the purpose of the experiment.

Not to be outdone, the investigators next conceived the idea of cutting a piece out of the base of the style, decapitating the faster-growing tubes while leaving the slower-growing ones intact. The shortened style was then re-united and the pieces held in place with a splint consisting of a hollow grass straw. Arriving at the cut the slow-growing tubes crossed this barrier and proceeded on in the race without the handicap of having to run against faster competitors.

In practice the method should prove valuable to plant breeders, for its success has been proven by the heredity of plants thus produced. Other scientifically valuable seeds obtained by this method are available for planting during the present growing season.

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ENTOMOLOGY

Far Eastern Beetle Pest Discovered on Long Island

AN INSECT pest apparently new to this country has been discovered breeding in the stems of greenhouse grapes at Oyster Bay, on Long Island, and is reported by E. P. Felt, director of the Bartlett Tree Research Laboratories at Stamford, Conn.

The insect belongs to the group known as the ambrosia beetles, and was identified by an expert on beetles at the British Museum of Natural History, London, as a species known only from Korea, Japan and Formosa, where it occurs on several native shrubs. It was probably brought to America, half way round the world, in some plant introduced from one of those countries.

It is well to watch for minute holes, a twenty-fifth of an inch in diameter, and recent borings in sickly plants, since these are most likely to be attacked, Mr. Felt suggests.

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ASTROPHYSICS

Cosmic Rays Caused by Solar Activity, Says French Physicist

By DR. VICTOR COFMAN,
Science Service Correspondent

EXTREMELY fast electrons, coming from the sun with a speed practically identical with that of light, may be responsible for the production of the cosmic radiation, whose origin is still wrapped in mystery. Dr. Alexandre Dauvillier, of the Institut des Hautes Etudes of Paris, puts forward this view in a theory that links together several happenings of the sky.

"My theory," stated Dr. Dauvillier, "gives definite shape to a view which has also been suggested by Lord Rutherford, namely that very fast electrons accelerated in very weak cosmic electric fields may account for the formation of cosmic rays."

The source of the electrons, according to the new theory, is to be found in the bright spots ("faculae") which are seen on the sun's surface. They represent regions where the temperature reaches seven thousand degrees centigrade. The negatively charged electrons stream out of these hot regions with relatively slow velocity, but are enormously speeded up as they move through the positively charged "atmosphere" of the sun. This atmosphere consists mostly of hydrogen and calcium atoms, positively charged because the ultraviolet radiation from the sun knocks out some of their electrons. The electrical field surrounding the sun thus resembles that around the earth.

Deflected Into Arcs

The speeded-up electrons coming from the sun are deflected in the form of arcs by the earth's magnetic field as they approach our planet. They strike the upper atmosphere and produce secondary electrons, which are responsible for the luminous effects seen as auroral arcs—first observed by Nordenskjöld in 1878. From the curvature of these arcs one may calculate the velocity and the energy of the original fast electrons, whose course was bent by the earth's magnetism. The velocity is found to be only 30 centimeters per second less than that of light. Hence the electron needs only a few minutes to reach the earth, and arrive practically at the same time as the light itself. This may explain a few remarkable cases of bright flashes on the surface of the sun accompanied immediately by electro-magnetic disturbances upon the earth. The earth is so completely surrounded by traces of these swift electrons, that the cosmic radiation seems to be coming from all parts of the sky.

The energy of the fast moving electrons corresponds very closely to that of the cosmic rays, and Dr. Dauvillier believes that there is no need to look elsewhere for an explanation. He brings in support of his view another set of calculations, based upon the frequency of the auroras seen at different latitudes.

Science News Letter, June 18, 1932

EVOLUTION

Birds of Different Families Look Almost Like Twins

STRANGE tricks of "convergent evolution"; by which creatures only remotely related to each other come to look like twins, are being studied among birds by Dr. Herbert Friedmann, curator of birds in the Smithsonian Institution. There can be no question of so-called mimicry in most of these instances, for the members of these pairs of mutually resembling birds are usually found in widely separated regions.

The familiar yellow-breasted meadowlark, for example, has a "twin" in a North African pipit, belonging to an entirely different bird family. There is no discernible advantage to either bird in looking like the other. Dr. Friedmann inclines to the opinion that it is merely a case of a relatively limited number of feather patterns being possible, and these two birds having happened to hit on the same combination.

There is something of the same nature to be found in bird songs, too, he says, although it cannot be checked so exactly as in the case of colors. He cites the case of a South African cuckoo that has a call closely similar to that of the American whippoorwill.

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HYGIENE

More Comfortable Summer Clothing For Men Advocated

ABOUT this time of year men look upon women's clothes with envy. They tug at their tight collars and consider their coats a penance to custom.

Attempts at reform of male attire along rational lines have been notably unsuccessful in the past. Minor gains have been made such as the growing substitution of the soft collar for the stiff starched neck encirclement. The penalty of further departures from common usage is notoriety and unwelcome attention.

Dr. A. Bachem, who is professor of biophysics of the College of Medicine of the University of Illinois, is the latest protagonist of sanity in men's clothes. In a research narrative issued by the Engineering Foundation, he predicts that fashion and science have now reached the point where a break may occur unless fashion gives away.

"It should not be difficult to design a garment without a narrow collar and a tight belt, so that air ventilation is permitted," he says. "Disposing of vest and coat should not carry the stigma of social misdemeanor, but should be permitted as a means to allow the body to cool off, to admit some light and to increase its vitality. So long as our mode of dressing is not improved, I see no advantage to ultraviolet or in the use of ultraviolet lamps."

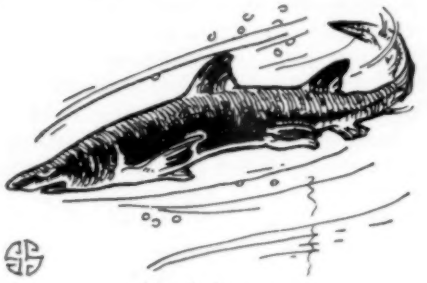
The skin is a heat regulator, conserving heat in cold and dissipating it in warmth. A complicated mechanism, including nerves, brain, glands and secretion and blood, must function perfectly.

Dr. Bachem contends that by living in closed rooms, by dressing in heavy and tightly fitting garments, we have allowed this mechanism to cease functioning so that we cannot withstand even small variations of temperature.

Science News Letter, June 18, 1932

ZOOLOGY

NATURE RAMBLINGS by Frank Thone



Shark Scares

NOW that the water is warming up off our North Atlantic summer resorts, the time is ripe for some first-class shark scares. Once in a while a bather actually does get bitten, but far more often a whole beachful merely get badly scared by a glimpse of that ominous sail-shaped fin.

The hue and cry would be justified if all sharks were man-eaters, but as it is, scores of amiable but nervous persons are scared into hysterics for no reason at all. Most of the sharks that one sees in the upper latitudes are perfectly harmless so far as man is concerned, and when they appear close inshore it is only because they are picking up a frugal meal of floating garbage or because they have pursued a fleeing school of smaller fish into shallower water. Few of them will be found to measure more than six feet or so in length, after the scare subsides that makes them look like whales. The real man-eaters of the tropic waters, that wander northward occasionally during hot summers, are three times that big at their smallest.

Even in the warm waters where sharks are supposed to be most wicked those fearsome-looking fish are not so bad as they are painted. Good swimmers go into shark-infested waters without fear; and it is one of the profitable "sports" of West Indian Negroes to tackle big sharks under water and kill them with a knife, for the excited delectation of tourists.

Dr. Paul Bartsch, of the U. S. National Museum, has done much diving in his work of photographing marine life at home. He states that he has always found the shark a gentleman, who will attend to his own business and leave others to mind theirs.

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• First Glances at New Books

Religion

THE RELIGION OF SCIENTISTS—C. L. Drawbridge—*Macmillan,* 160 p., $1.25. The secretary of the Christian Evidence Society sent to the members of the Royal Society a questionnaire applying the touchstone on six mooted points: spiritual domain, free will, evolution, personality of God, immortality and recent developments in scientific thought. In this book he analyzes the two hundred answers he received. Of the group answering, a very heavy majority are religious: on some of the questions believers outnumber non-believers more than twenty to one.

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Evolution

EFFECTIVENESS IN NATURE OF THE SO-CALLED PROTECTIVE ADAPTATIONS IN THE ANIMAL KINGDOM, CHIEFLY AS ILLUSTRATED BY THE FOOD HABITS OF NEARCTIC BIRDS—W. L. McAtee—*Smithsonian Institution,* 201 p., 75c. Evidently a good many of our notions regarding the "survival value" to animals of the so-called protective and warning colorations, mimicry, and even such seemingly solid defenses as spines and armor are in for a revision. The author has made a careful analysis of an unbelievable number of animals eaten by birds, and has learned that they that put their trust in armor find death no less easily than the weaponless weak.

Science News Letter, June 18, 1932

General Science

THE PROGRESS OF INDUSTRIAL RESEARCH—H. M. Tory—*National Research Council of Canada*—24 p., 10c. The President of the National Research Council of Canada summarizes the researches being developed in the new Canadian research laboratories just opened at Ottawa and compares them with the industrial research in other lands.

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Engineering

HYDRODYNAMICS—H. L. Dryden, F. D. Murnaghan, H. Bateman—*Natl. Res. Coun.,* 634 p., paper $4.50, cloth $5. As a report of the Committee on Hydrodynamics, Division of Physical Sciences of the Research Council, this volume is a valable reference work for engineers concerned with aerodynamic and hydrodynamic problems. It supplements the classic work of H. Lamb, which deals largely with the perfect fluid considered to have no friction, and presents additions to the knowledge of the behavior of viscous fluids, those whose friction is taken account of. Hundreds of papers published during the past 10 or 15 years are reviewed or referred to.

Science News Letter, June 18, 1932

Physiology

EXERCISE AND ITS PHYSIOLOGY—A. G. Gould and J. A. Dye—*Barnes,* 434 p., $3. Recent rapid progress in knowledge of this subject has led the authors to compile in this book the many studies of both American and European investigators. The book has somewhat the style of a textbook, with a series of questions at the end of each chapter. In spite of being technical, the book seems to fill a long-felt need.

Science News Letter, June 18, 1932

General Science

EXPLORATIONS AND FIELD-WORK OF THE SMITHSONIAN INSTITUTION IN 1931, 190 p. Smithsonian Institution explorations range the world from Arizona and Alaska to South Africa and the Danube valley, seeking all things from changes in the sun to relics of ancient man. This volume reports the activities for a typical year.

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General Science

FOURTEENTH ANNUAL REPORT—*National Research Council of Canada,* 210 p., 25c. The National Research Council of Canada combines in some aspects the function of the National Research Council of the United States, the Bureau of Standards and some of the research activities of the United States Department of Agriculture. Its research achievements as summarized in this report will interest many who are working in similar fields in the United States.

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Physics

THERMIONIC VACUUM TUBES—E. V. Appleton—*Dutton,* 117 p., $1.25. For the student of general physics who has not made a special study of radio frequency phenomena a leading British radio expert gives an account of the internal action of modern electron tubes and their applications in physics and electrical communication.

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Nutrition-Dietetics

FOODS IN HEALTH AND DISEASE—Lula G. Graves—*Macmillan,* 390 p., $3.50. Here is a book on nutrition that is, surprisingly, different. The author not only tells the familiar facts about food composition and production and dietetic values, but takes up in some detail the less frequently discussed but not unimportant foods such as cheese and nuts, and the unfamiliar, "new" foods like broccoli, "cashew apples" and their seeds (they are really not nuts) and avocadoes.

Science News Letter, June 18, 1932

Public Health

TOWARDS NATIONAL HEALTH—J. Anthony Delmege—*Macmillan,* 234 p., $6.50. Sir Thomas Legge has written the foreword to this book which describes the state of health and hygiene in England from Roman to Victorian times. The book is beautifully illustrated and interestingly written. Particular attention is given to discussion of occupational diseases and many readers may be surprised to learn how long ago some of these developed.

Science News Letter, June 18, 1932

Physics

PHYSICS FOR SECONDARY SCHOOLS—Oscar M. Stewart, Burton L. Cushing, Judson R. Towne—*Ginn,* 736 p., $1.72. A text for high schools that aims to make the subject more interesting, understandable and at the same time treated in such a way that the requirements of the College Entrance Board and the New York State Syllabus will be met.

Science News Letter, June 18, 1932

Astronomy

THE OBSERVERS HANDBOOK FOR 1932—Edited by C. A. Chant—*Royal Astronomical Society of Canada,* 80 p., 25c. This handbook, prepared principally for use in Canada, is an interesting addition to the reference shelf during this year.

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Engineering

INDEX TO PROCEEDINGS, Vols. 26-30, 1926-1930—*American Society for Testing Materials,* 251 p., cloth, $2.50, half leather, $3.50. A necessary part of any set of the valuable proceedings of this engineering society.

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First Glances at New Books

Continued from Page 395

Biology

RIDDLES OF SCIENCE — J. Arthur Thomson—*Liveright,* 387 p. $3.50. The most level-headed and best-informed of English scientists who can write in popular style takes up questions which used to be thought of as verging on the preternatural, like suspended animation, crystal-gazing, the cat's nine lives, and offers sound, common-sense answers. A considerable section of the book is taken up with the inexhaustible subject of evolution, its mode, its direction, and whether there is a purpose behind it. Those who know the author's other works will buy this one: a Thomson book needs no blurb.

Science News Letter, June 18, 1932

Child Study

BEHAVIOUR ASPECTS OF CHILD CONDUCT—Esther Loring Richards—*Macmillan,* 299 p., $2.50. Her position in the dispensary of the Henry Phipps Psychiatric Clinic of the Johns Hopkins University Hospital has given the author personal contact with a wide variety of childhood problems and a practical viewpoint which she has incorporated in this series of lectures now brought together in book form.

Science News Letter, June 18, 1932

Electricity-Physics

ADVANCED ELECTRICAL MEASUREMENTS—William R. Smythe, Walter C. Michels—*Van Nostrand,* 240 p., $3. The material of this book has been used in teaching a course in advanced electrical measurements given to senior students in electrical engineering, physics and chemistry at the California Institute of Technology.

Science News Letter, June 18, 1932

Aeronautics

AIRPLANE CONSTRUCTION AND REPAIR—John E. Younger—*McGraw-Hill,* 433 p., $3. A text which will undoubtedly prove useful in the training of airplane mechanics upon whom to a large degree the safety of our airlines depends.

Science News Letter, June 18, 1932

Chemistry

ALLEN'S COMMERCIAL ORGANIC ANALYSIS, Vol. IX—Edited by C. Ainsworth Mitchell — *Blakiston's,* 617 p., $7.50. This volume of the fifth edition covers the proteins of plants, proteins of milk, milk, milk products, meat and meat products. The contributors are, besides the editor: C. Jordan Lloyd, G. D. Elsdon, H. Leffmann and John Golding, E. R. Bolton, and C. Robert Moulton. The book gives in some detail properties, analytic methods, detection and estimation of impurities, adulterations and decomposition products of the subjects discussed.

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Child Health

NUTRITION—White House Conference Publication—*Century,* 532 p., $4. Some of the leading pediatricians and food chemists of the country have contributed to this volume which is one of the most meaty of the White House Conference reports so far published. It contains a wealth of sound information, discusses the leading theories of child nutrition, and should be of real value to practicing physicians throughout the country who are trying to prescribe for their little charges diets that are practical and scientifically sound.

Science News Letter, June 18, 1932

Archaeology

REDISCOVERING ILLINOIS—Arthur R. Kelly and Fay-Cooper Cole—*State of Illinois,* 23 p. This publication appears only as a chapter buried in a mass of statistics and political biographies making up the Illinois Blue Book for 1932; but it is worth consulting as a concise account of some of the outstanding recent results of the newly energized program of archaeological research in a state that has many important sites still to be explored.

Science News Letter, June 18, 1932

Child Health

BODY MECHANICS—White House Conference Publication—*Century,* 166 p., $1.50. The conference's sub-committee on orthopedics and body mechanics presents its findings with regard to posture and other features of body mechanics of American children, sets up standards and makes recommendations for bringing the children up to the standards. Physical educators and parents will be especially interested.

Science News Letter, June 18, 1932

Botany

A TEXTBOOK OF BOTANY FOR COLLEGE STUDENTS—D. M. Mottier—*Blakiston's,* 601 p. $4. A revision and amplification of an earlier book. The approach is made first through plant physiology, then morphology-systematics, finally ecology; an arrangement that has much to recommend it.

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Bibliography

ALUMNI READING LISTS—Extension Service, Library—*Univ. of Michigan,* 155 p., $1. More than one hundred and fifty reading lists each prepared by a specialist in his field, are assembled in logical order and published here in book form, as part of the program of the Bureau of Alumni Relations of the University of Michigan. Taken as a whole, any one of these lists may be considered a fairly comprehensive course of reading on the subject under consideration.

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Biology

ANIMAL BIOLOGY—L. L. Woodruff —*Macmillan,* 513 p. $3.50. An adaptation of the author's "Foundations of Biology," omitting chapters dealing with plants and thus making room for special treatment of representative forms from each of the chief phyla, many new illustrations, and other material, especially relating to man.

Science News Letter, June 18, 1932

Ornithology

THE BIRDS OF LOUISIANA—Compiled by S. C. Arthur—*Louisiana State Department of Conservation.* 598 p. 25 c. Few states have the varied wealth of bird life that Louisiana can boast, so that it is especially gratifying to see this bulletin appear, putting facts about them within reach and understanding of the lay enthusiast.

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Chemistry

PRODUCTION AND TRANSPORTATION COSTS OF CERTAIN OILS—U. S. Tariff Commission—*Govt. Print. Off.,* 240 p., 20c. Chemists and others interested in vegetable and animal oils will find this report of permanent value for reference purposes.

Science News Letter, June 18, 1932